

**What is claimed is:**

1. Transgenic plant seed having in its genome a recombinant DNA construct comprising at least one oil-associated gene operably linked to a promoter which is functional in said plant to transcribe said oil-associated gene.
- 5 2. Transgenic plant seed of claim 1 which grows into a plant having enhanced seed oil as compared to wild type.
3. Transgenic plant seed having in its genome a recombinant DNA construct comprising a gene suppression DNA operably linked to a promoter which is functional in said plant wherein transcription of said gene suppression DNA suppresses expression of an oil-associated gene.
- 10 4. Transgenic plant seed of claim 2 wherein transcription of said gene suppression DNA produces a dsRNA.
5. Hybrid maize seed which is produced by crossing two parental maize lines where at least one of said parental maize lines is a transgenic maize line which has in its genome a recombinant DNA construct comprising at least one oil-associated gene operably linked to a promoter which  
15 is functional in said plant to transcribe said oil-associated gene.
6. Hybrid maize seed of claim 5 wherein said parental maize lines are selected to produce maize plants characterized by agronomic traits where seed oil level for said maize plants is greater than seed oil level in the parental lines
7. Hybrid maize seed of claim 5 wherein said parental maize lines are selected to produce  
20 maize plants characterized by agronomic traits where there is essentially no reduction in yield and standability traits in said maize plants as compared to the parental lines.
8. Hybrid maize seed according to claim 5 having in its genome recombinant DNA constructs for over expressing 2 or more oil-associated genes.
9. A method of producing hybrid maize plants having enhanced levels of seed oil  
25 production and/or seed oil storage as compared to the closest non-transgenic ancestor maize lines for said plants, wherein the method comprises producing a transgenic maize plant having in its genome a recombinant DNA construct comprising at least one oil-associated gene operably linked to a promoter which is functional in maize to transcribe said oil-associated gene and crossing transgenic progeny of said transgenic maize plant with at least one other maize plant to  
30 produce said hybrid maize plants having enhanced levels of seed oil production. .

10 A method of breeding maize comprising selecting from a breeding population of maize  
plants a selected maize plant with higher oil than other maize plants in said breeding population  
based on allelic polymorphisms associated by linkage disequilibrium to a higher seed oil-related  
trait, wherein the selected maize plant has 1 or more higher oil alleles linked to a maize oil  
5 marker.

12. A method of breeding maize according to claim 10 wherein said selected maize plant has  
2 or more higher oil alleles linked to a maize oil marker.

13. A method of breeding maize according to claim 10 wherein said selected maize plant has  
3 or more higher oil alleles linked to a maize oil marker.

10 14. A method of breeding maize comprising selecting a maize line having a haplotype  
characterized by one or more of the maize oil markers.

15. A recombinant DNA construct comprising a promoter functional in plants operably  
linked to an oil-associated gene.

16. A polymorphic maize DNA locus which is useful for genotyping between at least two  
15 varieties of maize; wherein said locus comprises at least 20 consecutive nucleotides which  
include or are adjacent to a maize oil marker; and wherein the sequence of said at least 20  
consecutive nucleotides is at least 90% identical to the sequence of the same number of  
nucleotides in either strand of a segment of maize DNA which includes or is adjacent to said  
marker.

20 17. An isolated nucleic acid molecule useful for detecting a polymorphism associated with  
oil in maize, wherein said nucleic acid molecule comprises at least 12 nucleotide bases and a  
detectable label, and wherein the sequence of said at least 12 nucleotide bases is at least 90  
percent identical to a sequence of the same number of consecutive nucleotides in either strand of  
a segment of maize DNA in a locus of claim 16.

25 18. A pair of nucleic acid molecules, wherein each nucleic acid molecule of said pair is a  
nucleic acid molecule according to claim 17, and wherein each of said molecules has a distinct  
fluorescent dye at the 5' end thereof and has identical nucleotide sequence except for a single  
nucleotide polymorphism.

19. An isolated nucleic acid molecule useful for detecting a polymorphism in maize DNA,  
30 wherein said nucleic acid molecule comprises at least 15 nucleotide bases, wherein the sequence  
of said at least 15 nucleotide bases is at least 90 percent identical to a sequence of the same

number of consecutive nucleotides in either strand of a segment of maize DNA in a locus of claim 16.

20. A method of breeding maize comprising selecting a maize line having a polymorphism associated by linkage disequilibrium to a seed oil-related trait wherein said polymorphism is  
5 linked to a locus of claim 16.

21. A method of associating a seed oil-related trait to a genotype in maize comprising  
(a) identifying a set of one or more seed oil level traits characterizing said maize plants,  
(b) selecting tissue from at least two maize plants having allelic DNA and assaying DNA or  
mRNA from said tissue to identify the presence or absence of a set of distinct  
10 polymorphisms comprising at least one polymorphism linked to a locus of claim 16, and  
(c) identifying associations between said set of polymorphisms and said set of traits.